

ABSTRACT

A field emission device having emitter tips and a support layer for a gate electrode is provided. Openings in the support layer and the gate layer are sized to provide mechanical support for the gate electrode. Cavities may be formed and mechanically supported by walls between cavities or columns within a cavity. Dielectric layers having openings of different sizes between the emission tips and the gate electrode can decrease leakage current between emitter tips and the gate layer. The emitter tips may comprise a carbon-based material. The device can be formed using processing operations similar to those used in conventional semiconductor device manufacturing.

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